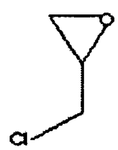
REMARKS/ARGUMENTS

Support for the amendment to Claim 13 is found at specification page 3, lines 13-16. The amendments to the original claims, and new Claims 11 and 12, are supported by the original claims. No new matter has been entered.

The present invention relates to a process for the manufacture of 1,2-epoxy-3-chloropropane, i.e., epichlorohydrin:



by reacting allyl chloride and hydrogen peroxide in the presence of a catalyst and in the optional presence of at least one solvent. As specified in all the claims herein, the allyl chloride used comprises less than 2,000 ppm by weight of 1,5-hexadiene.

The general reaction between allyl chloride and hydrogen peroxide has been described (specification page 1, lines 4-7). However, in this process the catalyst rapidly deactivates, sometimes after only a few hours of operation (specification page 1, lines 8-13). As explained in the present application, this catalyst deactivation causes frequent shut downs and gives rise to the necessity of fresh catalyst, both of which increase the cost of the process.

The present inventors have determined that when the reaction of allyl chloride and hydrogen peroxide is conducted in accordance with the present claims (i.e., the allyl chloride comprises less than 2,000 ppm by weight of 1,5-hexadiene) that rapid catalyst deactivation is avoided. See specification page 2, lines 10ff. This is demonstrated in several Examples of record herein, all of which show excellent results when using allyl chloride comprising less than 2,000 ppm 1,5-hexadiene.

This important discovery is deserving of patent protection. First, the presently claimed process is novel. Moreover, the presently claimed process is not obvious over Gilbeau (U.S. '941) in view of De Jong (WO '362).

Gilbeau discloses the reaction of allyl chloride with hydrogen peroxide in methanol in the presence of a TS-1 catalyst. See, e.g., Example 1 at column 4 of the reference. As noted in the Official Action, Gilbeau does not discuss 1,5-hexadiene, nor recognize the important role this material plays in the disclosed reaction. Certainly, 1,5-hexadiene is not identified as a result-effective variable in the reaction of allyl chloride with hydrogen peroxide.

De Jong relates to the purification of allyl chloride targeted for use in the production of dichlorohydrin (i.e., the non-epoxide isomers 1,2-dichloro-3-hyroxypropane and 1,3-dichloro-2-hydroxypropane). See page 1, lines 3-6 of the reference. For the preparation of dichlorohydrin, allyl chloride is reacted with water and chlorine in a dilute aqueous phase. De Jong page 1, lines 6-8. While dichlorohydrin can be used in the preparation of epichlorohydrin, it is clear from page 1, lines 1-14 of the reference that De Jong limits the uses of his purified allyl chloride to the production of dichlorohydrin, esters, allyl ethers, and allyl amines. In this regard, De Jong does not suggest or use allyl chloride in reaction with hydrogen peroxide to directly form epichlorohydrin, as claimed. As noted at page 2 of De Jong, he purifies allyl chloride for use in making dichlorohydrin, etc. in order to reduce by-products such as chloroaliphatic esters having 9-12 carbon atoms (see, e,g, De Jong at page 2, lines 1-3 and 11-13).

Nowhere in De Jong is it suggested that the allyl chloride disclosed therein be used in a reaction like that presently claimed or the one described in Gilbeau, nor is it suggested or disclosed that reducing the level of 1,5-hexadiene in allyl chloride to a level less than 2,000 ppm by weight would address the catalyst deactivation problem associated with reacting allyl

chloride with hydrogen peroxide. Because the combination of references fails to teach the present invention and the benefits it provides, the rejection should be withdrawn.

With regard to the double patenting rejection, a terminal disclaimer is attached hereto.

As this case is now in condition for allowance, Applicants request that this case be passed to Issue.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,
MAIER & NEUSTADT, P.C.

Richard L. Treanor
Attorney of Record
Registration No. 36,379

Customer Number
22850

Tel: (703) 413-3000
Fax: (703) 413 -2220
(OSMMN 06/04)